said water-wheel shafts connect to the steam-engine by a crank or wheel gearing. The middle parts or hubs M of the paddle-wheels are made hollow and water-tight, so that they may be both lighter and so buoyant as to relieve their shafts from weight and friction. When it is desirable to construct said paddle-wheels to ship and unship, a circular flange of metal larger in diameter than the crank is secured to the floor over the wheel-openings, embracing each water-wheel shaft. On said flange is attached by screw-bolts and packing a cylinder Q, reaching in height above the water-line, said cylinder Q to be removed and placed out of the way when the operation of shipping and unshipping the water-wheels is completed. Water-wheels fitted to ship and unship are thus attached to their shafts, viz: In the hub M is a female screw with perpendicular grooves for the reception of keys N, each of which is fitted with an eyebolt on its upper end, so as to admit of their being drawn by an iron hook and rod O to the top of the cylinder Q above the water-line and replaced in the same manner. The water-wheel shafts have a male screw P to correspond and fit the screw in the water-wheel hub M, and the operation of shipping and unshipping said wheel is thus performed: the engine is detached from the wheels by removing the connecting-rod or by throwing out the wheel-gearing, the cylinder Q is secured to its flange, the stuffing-box is taken off, the pedestals are taken out, the shaft-keys N are drawn, and the shafts are unscrewed and hoisted into the vessel through the cylinder Q. The water-wheels being now detached, any seaman can readily draw them from the wheel-openings and hoist them inboard and place another in the wheel-opening. The paddle-wheel will then rest on the bottom of the wheel-opening. Lower the shaft and turn it till the end takes in its saucer, then till the wheel is clear of the bottom of the wheel-opening, and key it. Put in the pedestals, which will nearly exclude the entrance of water. Pump the water out of the cylinder Q, and while placing the stuffing-box turn a cock in the lowest part of the cylinder Q, through which any water passing the pedestals will run into the hold of the vessel. Detach the cylinder Q and remove it and connect the engine.

What we claim as our invention, and desire to secure by Letters Patent, is—

The application of shield-decks to vessels constructed of metal or wood, whether propelled by steam-power or any other, and also the application of submerged water-wheels on the plan described in the accompanying specification, whether placed horizontally or obliquely, for the purpose of propelling vessels.

WM. W. HUNTER.
B. HARRIS.

Witnesses:
THO. NEWTON,
WM. INSELL.